

Raised glucose concentrations and diabetes are associated with cancer risk

Susan Mayor *London*

High fasting serum glucose concentrations and diabetes are associated with increased risk of death from several cancers, according to a Korean follow up study of more than one million people (*JAMA* 2005;293:194-202).

The Korean cancer prevention study included all of the 829 770 men and 468 615 women aged 30 to 95 years receiving health insurance from the National Health Insurance Corporation who had had a health check every two years during 1992-5. Fasting serum glucose measurements were taken during these health checks.

For the follow up study the researchers collected cancer mortality and cancer incidence data from the national cancer registry and hospital records.

Overall, 20 566 men and 5907 women died from cancer in the 10 years of follow up, which was measured from the time of the first recorded serum glucose measurement. People in the group with the highest fasting serum glucose value (≥ 7.8 mmol/l) had higher death rates from all cancers combined (29% (95% confidence interval 22% to 37%) higher for men; 23% (9% to 39%) higher for women) than those with the lowest concentration (< 5.0 mmol/l), after smoking and alcohol use were controlled for.

Cancer incidence reflected a similar pattern. Risks for cancer incidence and mortality were generally greater in people with diabetes than in those without.

Results showed the strongest association between raised glucose concentrations and cancer for pancreatic cancer. Men with the highest glucose concentrations

had a relative risk of 1.91 (1.52 to 2.41) compared with men with the lowest. For women with the highest concentrations, the relative risk was 2.05 (1.43 to 2.93) compared with those with the lowest.

Significant associations were also found for cancers of the oesophagus, liver, and colon or rectum in men and of the liver and cervix in women, and there were significant trends with glucose concentration for cancers of the oesophagus, colon or rectum, liver, pancreas, and bile duct in men and of the liver and pancreas in women.

Dr Sun Ha Jee, from the Graduate School of Public Health, Yonsei University, Seoul, South Korea, said, "We have shown that fasting serum glucose level and diabetes are associated with cancer risk in a population far leaner than the Western populations in other studies. These associations do not reflect confounding by obesity, suggesting that the mechanism of increased cancer risk reflects the consequences of hyperinsulinaemia."

Insulin is known to affect cell growth, and both diabetes and the metabolic syndrome are associated with systemic inflammation, which could explain the increased cancer risk.

An accompanying editorial from Kathleen Cooney and Stephen Gruber from the University of Michigan Medical School, Ann Arbor, noted that the relative risks of raised glucose or diabetes on cancer were modest and so the fraction of cancers attributable to raised fasting glucose in the Korean population was small, although this was partly because of the relatively low prevalence of diabetes. The impact of the association might be greater in countries with higher rates of diabetes. The editorial's authors hoped that some of the cancer deaths may be preventable, concluding, "Further studies will be required to demonstrate that reductions in hyperglycemia and diabetes will lead to declines in cancer mortality" (*JAMA* 2005;293:235-6). □

Evidence grows that eating red meat increases cancer risk

Scott Gottlieb *New York*

High consumption of red and processed meat is associated with an increased risk of colon cancer, a new study has confirmed.

Meat consumption has previously been associated with colorectal cancer in earlier studies, but the strength of the association and types of meat involved have not been consistent (*JAMA*, 2005;293:172-82).

Dr Ann Chao of the American Cancer Society, Atlanta, Georgia, and colleagues examined the relation between long term meat consumption and the risk of colon and rectal cancer in 148 610 adults aged 50 to 74 years in the United States. The patients all provided information on consumption of red meat, poultry and fish, and processed meat in 1982 and then again in 1992-3. The study participants were all enrolled in the second cancer prevention study (CPS-II).

Dietary assessment was based on a 68 item questionnaire about the frequency of

intake of certain foods. The researchers estimated consumption of each meat item (in grams per week) on the basis of the average frequency that meat was eaten each week, the number of grams in a medium serving, and the serving size.

The authors considered red meat to include the following individual or grouped items on the questionnaire: bacon; sausage; hamburgers, cheeseburgers, meatloaf, or casserole with minced beef; beef (such as steaks and roasts, and including sandwiches); beef stew, or "pot pie" with carrots or other vegetables; liver, including chicken livers; pork, including chops, roast; hot dogs; and ham, bologna (sausage), salami, or luncheon meat. Processed meat was defined as including bacon; sausage; hot dogs; and ham, bologna, salami, or luncheon meat.

The researchers found that high intake of red and processed meat reported in 1992-3 was associated with a

higher risk of colorectal cancer after adjustment for age and energy intake but not after further adjustment for body mass index, cigarette smoking, and other covariates.

The researchers identified a total of 1667 colorectal cancers from when the participants last reported on meat consumption (1992-3) until 31 August 2001. For processed meat, when long term consumption was taken into account, people in the highest third of consumption (both in 1982 and in 1992-3) had a

higher risk of distal colon cancer (risk ratio 1.50; 95% confidence interval 1.04 to 2.17) than those in the lowest third. The relative risk for rectal cancer for high consumption of red meat as a whole was also raised (1.43; 1.00 to 2.05).

Long term consumption of poultry and fish was inversely associated with risk of both proximal and distal colon cancer. Those with the highest consumption of fish and poultry had a relative risk of colon cancer of 0.84 (0.70 to 1.02). □



Eating large quantities of red meat seems to increase the risk of rectal cancer by 40%